CLAIMS

What is claimed is:

1. A Super-Regenerative Radio Frequency Receiver, which comprises:

an oscillator used for providing an oscillating output signal based on a radio frequency signal and a quench signal;

a rectifier coupled to the oscillator and used for providing a rectified signal based on the oscillating output signal;

a low-pass filter coupled to the rectifier and used for obtaining a data signal by low-pass filtering the rectified signal; and

a common-mode feedback circuit coupled to the low-pass filter and the rectifier, and used for rectifying a common-mode voltage of the data signal and providing a common-mode feedback signal to the rectifier, wherein upon receiving the common-mode feedback signal the rectified signal is adjusted accordingly.

2. The Super-Regenerative Radio Frequency Receiver in claim 1, wherein the common-mode feedback signal is a common-mode feedback current, and the rectifier comprises:

a reference current source used for providing a reference current;

a current adder circuit coupled to the reference current source, and used for adding up the reference current and the common-mode feedback current and providing an operating current as an output; and

a pseudo differential rectifier coupled to the current adder circuit, and used for rectifying the oscillating output signal to obtain the rectified signal, wherein the pseudo

differential rectifier uses the magnitude of the operating current to adjust the voltage level of the rectified signal.

3. The Super-Regenerative Radio Frequency Receiver in claim 2, wherein the rectifier further comprises a power sink circuit, is coupled to the pseudo differential rectifier, and is used for keeping the circuit elements in the pseudo differential rectifier from being saturated.

4. The Super-Regenerative Radio Frequency Receiver in claim 2, wherein the oscillating output signal comprises a first oscillating output signal and a second oscillating output signal, and the pseudo differential rectifier comprises:

a first transistor in which the first source/drain is coupled to the operating current and the rectified signal, the gate is coupled to the first oscillating output signal, and the second source/drain is connected to a ground reference;

a second transistor in which the first source/drain is coupled to the operating current and the rectified signal, the gate is coupled to the second oscillating output signal, and the second source/drain is connected to the ground reference and the second source/drain of the first transistor;

a third transistor in which the first source/drain is coupled to the operating current, the rectified signal, the first source/drain of the first transistor, and the first source/drain of the second transistor, the gate is coupled to a quench control signal, and the second source/drain is connected to a voltage power supply; and

a capacitor comprising a first terminal and a second terminal, in which the first terminal is coupled to the quench control signal, and the second terminal is coupled

to the operating current, the rectified signal, the first source/drain of the first transistor, the first source/drain of the second transistor, and the first source/drain of the third transistor.

5. The Super-Regenerative Radio Frequency Receiver in claim 1, wherein the common-mode feedback circuit comprises:

a comparator and amplifier used to compare the data signal and a reference common-mode voltage and to amplify a comparison result, thereby to provide a comparison signal; and

a feedback low-pass filter coupled to the comparator and amplifier, and used low-pass filtering the comparison signal to obtain a feedback signal.

6. The Super-Regenerative Radio Frequency Receiver in claim 5, wherein the common-mode feedback signal is a common-mode feedback current, and the common-mode feedback circuit further comprises a voltage-to-current transformer coupled to the feedback low-pass filter used for transferring the feedback signal to the common-mode feedback current.

7. The Super-Regenerative Radio Frequency Receiver in claim 5, wherein the comparator and amplifier operates at a sub-threshold mode.

8. The Super-Regenerative Radio Frequency Receiver in claim 5, wherein the comparator and amplifier comprises:

a first transistor operating at the sub-threshold mode in which the first

source/drain is coupled to a terminal of a current mirror, the gate is coupled to the data signal; and

a second transistor operating at the sub-threshold mode in which the first source/drain is coupled to another terminal of the current mirror and to the comparison signal, the gate is coupled to the reference common-mode voltage, and the second source/drain is coupled to the second source/drain of the first transistor.

9. The Super-Regenerative Radio Frequency Receiver in claim 1, wherein a saw-wave generator is coupled to the oscillator to generate the quench signal.

10. The Super-Regenerative Radio Frequency Receiver in claim 1, wherein a slicer is coupled to the low-pass filter to slice the data signal and to provide an output data.

11. The Super-Regenerative Radio Frequency Receiver in claim 1, wherein the common-mode feedback signal is a common-mode feedback current.

12. The Super-Regenerative Radio Frequency Receiver in claim 1, wherein the quench signal is a quench current signal.

13. A data receiving method of Super-Regenerative Radio Frequency Receiver used for receiving a radio frequency signal to obtain a data signal, which comprises:

providing a quench signal;

providing an oscillating output signal according to the radio frequency signal and the quench signal;

rectifying a common-mode voltage of the data signal, and providing a common-mode feedback signal;

providing a rectified signal according to the oscillating output signal, and adjust the rectified signal according to the common-mode feedback signal; and

filtering the rectified signal to obtain the data signal.

14. The data receiving method in claim 13, wherein the common-mode feedback signal is a common-mode feedback current, and the process of obtaining the rectified signal comprises:

providing a reference current;

providing a operating current by adding the reference current and the common-mode feedback current up; and

rectifying the oscillating output signal to obtain the rectified signal, and using the magnitude of the operating current to adjust the output voltage level of the rectified signal.

15. The data receiving method in claim 13, wherein the procedure for rectifying the common-mode voltage of the data signal and providing the common-mode feedback signal comprises:

providing a reference common-mode voltage;

comparing the data signal and the reference common-mode voltage, amplifying the comparison results, and outputting a comparison signal; and

filtering the comparison signal to obtain a feedback signal.

16. The data receiving method in claim 15, wherein the common-mode feedback signal is a common-mode feedback current, and the procedure for rectifying the common-mode voltage of the data signal and providing the common-mode feedback signal further comprises:

transferring the feedback signal to the common-mode feedback current.